UNITED TECHNOLOGIES
PRATT&WHITNEY

400 Main Street
East Hartford, Connecticut 06108

Lighter

January 16, 1987

Mr. George Dews
Senior Sanitary Engineer
Hazardous Waste Management Section
Department of Environmental Protection
165 Capitol Avenue
Hartford CT 06106

Merrill S. Hohman, Director
Waste Management Division
US EPA
JFK Federal Building
Room 1903
Boston, MA 02203

SUBJECT: Revised Incinerator Closure Plan
Pratt & Whitney East Hartford
EPA ID # CTD 990672081

Dear Sirs:

Attached is the revised closure plan for the hazardous waste incinerator at the East Hartford Main Street Facility. This revision to our July 16, 1986 submittal includes our response to the comments prepared by the contractor used by your office. We received these comments in a joint letter from EPA Region I and the Connecticut Department of Environmental Protection on December 24, 1986.

We would like to begin closure operations as soon as approval is obtained, and would once again appreciate a timely review. Contact Kevin P. Vidmar at (203) 565-2016 with any questions or comments.

Sincerely,

John G. Whitehead

John G. Whitehead
Plant Manager

JGW/KPV/tc

Attached

cc: A.C.Caldwell
J.W.Casey

CLOSURE PLAN

FOR THE BURN-ZOL

HAZARDOUS WASTE INCINERATOR

RESOURCE CONSERVATION AND RECOVERY ACT

CONCENTRATED WASTE TREATMENT PLANT

PRATT & WHITNEY

400 MAIN STREET FACILITY

EAST HARTFORD, CONNECTICUT

EPA ID # CT D 990672081

JANUARY 16,1987

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APPENDICES

HAZARDOUS WASTE INCINERATOR CLOSURE PLAN

1.0 INTRODUCTION

This closure plan is for the hazardous waste incinerator located at the Concentrated Waste Treatment Plant (CWTP) of the Pratt & Whitney (P&W) East Hartford Main Street Facility, EPA ID No.CT D 990672081. Closure of this unit will be conducted in accordance with all applicable RCRA regulations, and will:

1) Minimize the need for further maintenance, and;

2) Control, minimize or eliminate to the extent necessary, the post closure release of hazardous wastes to groundwater, surface water or the atmosphere.

In subsequent sections, this closure plan provides a description of general methods to be applied and precautions to be taken in closing the incinerator. A trackable closure schedule and the specific closure methods will be described in detail, as will the closure cost estimate.

The following general information applies to this plan:

1) Personal Health and Safety- The decontamination crew will consist of a minimum of two individuals at all times who will be adequately clothed, including self-contained breathing apparatus, if required, and coveralls. Supervision of the decontamination process will include the individual(s) responsible for operation of the Concentrated Waste Treatment Plant.

2) Sudden or Non-Sudden release, or Fire Hazard- The decontamination process will be considered as an activity presenting a moderate risk potential for release of hazardous waste or fire/explosion hazard. As such, the appropriate mechanisms of the contingency plan will be readily available for activation.

This plan is the second revision to the closure plan submitted to the DEP originally on January 6, 1986. The first revision, submitted July 16, 1986 to EPA and DEP, contained additional information and changes which were required by the DEP in a February 24, 1986 letter, and in subsequent meeting and site visits with the DEP on closure of this incinerator. This second revision will address the comments prepared by an EPA contractor and subsequently submitted by the EPA/DEP in a joint letter to Pratt & Whitney on December 23, 1986.

2.0 FACILITY DESCRIPTION

The CWTP is the Hazardous waste facility at the P&W East Hartford

Main Street plant. Hazardous wastes are brought to the CWTP from areas within this manufacturing facility and from other P&W plants located within Connecticut.

As specified on the RCRA Part A application, the CWTP consists of a hazardous waste barrel storage, transporter storage, tank storage, and a liquid injection hazardous waste incinerator. All portions of the facility surrounding the incinerator are paved.

The incinerator has never met performance criteria, and outside of the allowed test burns to determine operating parameters and compliance with regulatory standards, this unit has never been used to treat any hazardous wastes. Only the incinerator portion of the CWTP will undergo closure as described in this plan.

3.0 INCINERATOR DESCRIPTION

A diagram of the incinerator and associated equipment is presented in appendix A. Below is a narrative description of this equipment, the sum total of which shall be referred to in later sections as the incinerator train.

The incinerator located at the CWTP is a Burn-Zol Model 272 liquid injection waste incinerator. Physically the incinerator is cylindrical in shape, being 6'6" outside diameter by 21'3" high with 3" of forced air cooling between the outer stainless steel shell and the steel inner shell. There is then a minimum of 6" of high temperature acid resistant refractory lining. The primary and secondary combustion chambers and the tertiary holding chamber are 5' in diameter or 19.5 square feet in area.

The primary chamber has two (2) dual fuel Maxon 3" Multifire II burners rated at 1.5 Million British Thermal Units per hour (MM BTU/hr) each. These burners use either natural gas or No. 2 fuel oil. There are also three (3) nozzles in this chamber for injection of wastes. Each nozzle is air cooled and is accessible from the outside for interchanging nozzles for proper atomization of waste charges.

The secondary chamber has one (1) dual fuel Maxon 4" Multifire II burner rated at 2.5 MM BTU/hour. All burners have Protectifier flame safeties on the pilots and 20:1 throttleable and proportional control.

The incinerator combustion units are directly outside and adjacent to the building containing the remainder of the incinerator train. Also inside this building are numerous other CWTP operations which will remain active after closure of the incinerator.

Combustion products from the incinerator are ducted to an Eclipse Model 3 HRW waste heat boiler which generates hot water. A pitot

tube with indicator is in the duct before this blower to indicate combustion gas velocity. Generated hot water is cooled in a B&G tube and shell heat exchanger with the cooling water being dumped to a NPDES permitted cooling water discharge. This water was eventually intentioned for heating the building.

From the boiler combustion products are then ducted to a Hydronics Model VS 72 venturi scrubber and a Hydronics Model PTS 72 packed tower counterflow scrubber operating with caustic wash. Both scrubbers are fabricated of stainless steel and the tower contains polypropylene Tellerette packing. To protect the packing there is a thermocouple and temperature switch in the inlet duct that will shut down the incinerator before the packing has any thermal damage. There is also a liquid manometer across the venturi to indicate pressure drop. The pressure drop is used as an indication of air velocity and venturi scrubber efficiency. The venturi scrubber is designed for particulate removal while the packed tower has high gas/liquid area for removing fine particulate and neutralizing acids in the waste gas stream. At the exit of the scrubbers is a demister system to remove liquid entrainment in the waste gas stream. The caustic wash is contained in a 400 gallon tank and circulated through the scrubbers at 65 gallons per minute (GPM). The pH is controlled at 7.0-8.5 by the addition of liquid sodium hydroxide.

The air from the demisters is ducted through a damper system to one of two prime air movers. These are New York Blower Series 45 Gl fans, size 264 with 60 horse-power (HP) motors rated at 4000 cubic feet per minute (cfm) at 37" water. One blower is the prime mover with the second used as a back-up. The exhaust from the blower is directed out the exhaust stack on top of the building.

The system is an induced draft system, indicating the entire system operated under negative pressure conditions. As such, air could only be pulled into the ducts, as opposed to emissions occurring from the ductwork to the outside. All emissions from the unit would be ducted and discharged through the exhaust stack.

4.0 PERMITTING HISTORY

On September 19, 1979 P&W submitted an application to the Connecticut Department of Environmental Protection (DEP) Air Compliance unit to construct a liquid injection hazardous waste incinerator. The permit to construct was granted on August 9, 1980, and construction commenced immediately. The construction was essentially complete in April 1981. Since that time test burns were conducted at various times to define the performance of the unit compared to the regulatory standards. As described in the section below, these performance tests indicated excessive particulate emissions, and the required Construction and Operation

permits from the DEP Air Compliance Unit expired while these problems were investigated. Renewals of these permits have been requested and received from the DEP on numerous occasions, as each performance test defined additional construction and testing work necessary to attempt in bringing the incinerator into regulatory compliance.

The incinerator was included in the Part B Permit Application submitted to the DEP originally in April of 1983. The subsequent revisions to this application included updated information on the incinerator and proposed trial burn plan. The DEP issued P&W the most recent Notice of Deficiency (NOD) on this permit application in October, 1985. Included in this NOD were requests for additional incinerator information. As a response, P&W decided to close the incinerator and remove it from the Part B Permit Application process.

5.0 TEST BURN HISTORY

Three sets of test burns have been conducted on the unit. The first such burn was conducted March 30 and 31, 1982. These tests included approximately seven hours of burning, split between cyanide solutions and wax/solvent mixture. These test burns indicated excessive particulate and combustion problems.

To attempt in correcting the problems noted during this initial test burn, new injection nozzles were installed to increase atomization of the wastes, new burner controls were installed, and the exhaust stack was insulated to reduce the exterior fan noise.

A second test burn was conducted December 12-13, 1983 to determine the particulate emissions rate when burning these same two waste streams. This test consisted of approximately seven hours of burning, again split between these two waste streams. The test results indicated particulates again exceeding state requirements. As a result of this test, a second demister was installed.

The most recent and final test burn was conducted May 30, 1984 using only the wax/solvent mixture. This test further indicated excessive particulate emissions and poor destruction efficiencies, even after all the above modifications had been completed. P&W's consultant on the project, Recon Associates, analyzed the results of this test and all previous test data and proposed a series of much more extensive modifications which they felt could possibly bring the unit into regulatory compliance. After review of Recon's report, the decision was made to close the incinerator in accordance with all applicable regulations.

Four (4) different waste types had originally been proposes for treatment; blend oil, Zyglo solution, cyanides, and wax/solvents. Only the cyanides and wax/solvents are hazardous wastes. Each of the wastes were to be injected into the incinerator from a

separate nozzle except the Zyglo and cyanides which were to be from a common nozzle. However as indicated above, only the cyanide and wax/solvent solutions have been burned, and this occurring only during the allowed test burns. Analytical data on the cyanide and wax/solvent mixtures are presented in appendix B.

6.0 CLOSURE PROCEDURES AND SCHEDULE

Only the incinerator portion of the CWTP will be undergoing closure activities. At closure, all hazardous wastes and hazardous waste residues (including ash) will be removed from the incinerator, waste heat boiler, and associated air pollution control equipment.

As has been previously mentioned, the incinerator has never been operational except for the allowed test burns, and will not become operational during the closure. Therefore there will not be any final treatment steps in the closure procedures described below. For the same reason, there will be no description of the operating conditions and operating procedures.

There are no storage tanks or storage structures at the CWTP dedicated to holding wastes for the incinerator, and therefore there will also be no need to discuss the maximum closure waste inventory or storage inventory.

The closure process concerns itself only with the decontamination of the interior of the incinerator, waste heat boiler, and associated air pollution control equipment, and the disposal of any hazardous wastes or hazardous waste residues. The following procedures will describe this work.

1. Remove any residue and ash (if present) from the incinerator, waste heat boiler, and pollution control equipment and test to determine if they are a hazardous waste. The sampling, and testing and determination methods are presented in sections 9.0 and 10.0 respectively. The residue or ash will be removed by shovel or other such appropriate and similar tool.

2. Take samples of the refractory brick from the primary incineration chamber, the secondary and tertiary incineration chambers, the refractory lined ductwork, and waste heat boiler refractory. In order to better define the extent of closure work required, this sampling has already been performed, with the sample locations and results available in appendix D. Where possible, sample locations were chosen to to specifically include any discolored or stained areas.

The refractory brick was analyzed for the parameters specified in section 10. Samples were taken by scraping the brick using a small putty type knife. Samples within the ductwork were

taken in a complete circle circumscribing the ductwork, while those inside the incinerator and the waste heat boiler were simply taken at specific predetermined locations, some of which were modified slightly to include visibly stained material as noted above.

The samples taken from each section were composited for analysis, as is detailed in appendix C. Also included in this appendix is a table with the composite results, and copies of the actual laboratory data sheets. No cyanides or solvents specified in section 10.0 were found in any of the refractory composite samples. As for the remaining parameters (the EP Toxic metals), only the composite sample from the primary incineration chamber hearth exhibited the characteristic of EP toxicity, and therefore a hazardous waste. While the samples taken of visual contamination on the actual primary chamber walls are not contaminated with hazardous wastes, this whole chamber shall be treated as one entity. Therefore all refractory brick shall be removed from the primary combustion chamber and treated, stored, and disposed of properly as a hazardous waste. The refractory will be removed using a pick and shovel, or other such appropriate and similar tools, and placed in 55 gallon drums for proper landfill disposal at a fully permitted landfill.

The remaining incineration chambers and refractory lined areas do not exhibit any hazardous waste characteristics, and as such, are not hazardous wastes. It is planned to dispose of the remaining refractory brick and lining as a regular solid industrial waste in the East Hartford Town Landfill once approval is given by the Solid Waste Unit of The DEP. Approval was granted by the DEP for this disposal on November 21, 1986.

3. The waste feed lines and injection nozzles will be flushed from the pumps located in the basement of the drum storage building to the incinerator using an appropriate solvent. Ordinary process water will first be used to flush the cyanide line, followed by a dilute sodium hydroxide flush. Rinsate from these two flushes shall be considered hazardous wastes and will be treated, stored, and disposed of accordingly. This line will then be flushed again using ordinary process water. This flush will be collected and tested to determine if it is a hazardous waste following the procedures and parameters detailed in sections 9.0 and 10.0. If found to be hazardous, the three step flushing procedure will be repeated until the process water flush if determined to be non-hazardous.

The waste oil and solvent line will be flushed using virgin jet fuel. All rinsate from the flushing of these lines will be treated as hazardous wastes and will be treated, stored, and disposed of accordingly. Following this flush, these lines will be flushed using process water, which will be collected and tested to determine if it is a hazardous waste following the procedures and parameters listed in sections 9.0 and 10.0. If found to be hazardous, this two step flushing procedure will be repeated until the process water rinsate is determined to be non-hazardous.

4. Decontaminate the incinerator combustion chambers using steam pressure wash. All steam rinsate will be contained and collected in DOT 17 E drums, sampled and analyzed following the methods described in sections 9.0 and 10.0 to determine if this rinsate is a hazardous waste. This rinse step will be repeated until it is determined that the rinse waters are not a hazardous waste.

5. The steam rinse, collection, and testing procedures described in step 2 above will then be carried out in the sequential flow process on the exhaust gas piping, waste heat boiler, venturi scrubber, packed tower scrubber, and demisters, induced draft fan, and exhaust stack. The scrubber water solution tanks will also be rinsed, as will the concrete containment pit in which it sits. Rinsing of this equipment will also be repeated until the rinse water is determined to be non-hazardous.

6. Following the above steps, a "wipe" sample will be conducted on the interior of the incinerator and incinerator train items mentioned in step 5 above. The procedure to be followed is included in appendix D. Analysis will be performed for the metals and cyanide as defined in section 10.0. Analysis for the solvents will not be conducted as no solvents were found in the refractory samples, and since the "wipe" protocol is not applicable for these solvents (see section E-2. of the procedure in appendix D). In addition, any solvents left before the steam wash will be vaporized or captured in the rinsate during the steam rinse procedure. Four (4) wipes of a ten by ten centimeter area will be taken per combustion chamber. The number per each remaining section is as specified in appendix D. This appendix also has a diagram showing the approximate wipe sample locations. At a minimum there will always be at least two (2) per section. All wipe samples from the same combustion chamber or the same incinerator train section will be composited for analysis.

It is extremely difficult to arrive at a standard for comparing the "wipe" test results, as this arbitrary test only provides a two dimensional determination, and there are presently no two dimensional standards available from the DEP or the EPA. All so-called "clean" standards are based upon concentrations, or three dimensional determinations. Because there are no standards and the "wipe" test is so arbitrary, Pratt and Whitney will be using the delisting concentrations as the comparison standard to determine if steam pressure rinsing should be re-performed after wipe sampling.

The results of the composite extraction procedure will be compared to the delisting values for the metals. These delisting values are the presented in table 3 in parentheses, and are the hazardous levels when multiplied by 0.3. For example, the delisting level of barium is 100 mg/l x 0.3, or 30 mg/l.If the leachate levels exceed these values, the section will be steam washed again, with another round of wipe samples taken afterward.

Once steps 1 through 6 have been successfully completed, certification of closure will be signed by Pratt & Whitney and an independent registered professional engineer and submitted to the DEP. This form is presented in section 11.0. Once certification is obtained, Pratt & Whitney will also submit a revised Part A permit application with the incinerator removed.

All rinse waters will be collected, and placed in DOT approved 17E drums. These drums will be placed in the barrel storage building while awaiting this determination, so that any spill of this material will be contained should it be determined to be hazardous.

Rinse waters found not to be hazardous wastes by the test and determination methods contained in section 10.0 will be discharged into the NPDES permitted wastewater treatment system.

A wipe sample will not be taken on the outside of any portion of the incinerator train due to the negative draft airflow design. This design prevented any emissions from escaping the incinerator train and contaminating the outside. For this reason outside decontamination is not necessary. Similarly, no decontamination or sampling will be considered on the surrounding pavement or structures outside or inside the building because the unit was used for such a short duration and there were never any leaks or spills of materials during this limited use, as confirmed by numerous visual inspections during this time. In addition, this is an active waste treatment area and all areas will continue to be used for other waste treatment operations.

Following completion of closure, the incinerator will be abandoned in place, with future removal. It is presently planned that portions of the air pollution control equipment inside the building will be removed, and the area occupied by this equipment used for additional CWTP activities.

All wastes found to be hazardous will be disposed of properly by an appropriate and fully permitted vendor.

Table 1 presents the estimated timetable to complete all required closure activities described in this section. All dates are relative to public notice being completed and approval of the closure plan occurring at Month 0.

TABLE 1

TRACKABLE CLOSURE TIMETABLE

	Estimated Time To Complete Steps	Total Time
Step 1 and 2	2 Months	2 Months
Step 3 and 4	2 Months	4 Months
Step 5 and 6 and Certification	2 Months	6 Months

The actual time required to perform the closure activities may be completed ahead of this timetable. P&W would like to begin the closure immediately upon receiving the DEP's final approval.

7.0 MAXIMUM WASTE INVENTORY

As previously mentioned, the unit never operated besides the three short test burn periods. Therefore little, if any, waste inventory ever existed or exist today, as specified below;

1. Incinerator ash - The wastes burned were not high in ash content or burned in sufficient quantities to produce any visible quantities of ash. This has been verified by visual inspection of the unit. In addition, initial combustion of the wastes occurred in the primary chamber, and any ash would be present in this chamber. We intend to remove and dispose of all materials and refractory from the primary chamber as hazardous waste. Therefore any ash which was generated will be handled appropriately.

2. Scrubber Waters - All scrubber waters were kept in the pH range of 7.0 to 8.5 as indicated previously. The test burn durations were not sufficient to produce waters which were hazardous wastes. After each test burn, all scrubber waters were tested for cyanide, chromium and pH, and discharged into the NPDES permitted wastewater treatment system. As the unit is not operational, there is no inventory of scrubber waters to consider in the closure plan.

3. Scrubber sludges - The test burn durations were not sufficient to produce any scrubber sludges. As the unit is not operational, there is no inventory of scrubber sludge to consider in the closure plan. In addition, no sludges were generated from any other portion of the incinerator train during the very limited test burns, and therefore no inventory is included.

8.0 CLOSURE COST ESTIMATE AND UPDATES

Closure costs are in Fall 1980 dollars, and are based upon 1) third party contractor labor @ $200/Man Day, 2) transport and treatment of 55 gallon drums @ $100/each, and 3) analytical costs of $200/sample. All other costs are based upon "Means 1980 Cost Data." The third party labor rate is based upon consideration of cleanup contractor rates presently available (as of 1986) in the local area. Present labor rates are approximately $30.00 per hour, which would be $24.00 per hour in 1980 dollars.

For the reasons previously mentioned, there are no costs included in the estimate presented below dealing with testing or decontamination of the outside of the incinerator train equipment, surrounding structures or building interior.

Step 1 Removal and Disposal of Ash and Residue

A.	Testing-10 samples	= 2,000
B.	Labor	= 1,000
C.	Disposal-10 drums	= 1,000
		Sub-Total = $4,000

Step 2 Refractory Sampling and Removal

A.	Take samples-labor	= 200
B.	Testing-9 composites	= 1,800
C.	Remove refractory-labor 2 men, 5 days	= 2,000
D.	Disposal-Primary Chamber 10 drums	= 1,000
		Sub-Total = $5,000

Step 3 Flush Waste Feed Lines

A.	Labor-2 men, 2 days	= 800
B.	Flush Fluids	= 100
C.	Testing-3 samples	= 600
D.	Disposal-3 drums	= 300
E.	Equipment-pumps,etc.	= 200
		Sub-Total = $2,000

Step 4 Rinsing Procedures- Main Unit

A.	Testing-10 samples	= 2,000
B.	Labor- 5 men, 3 days	= 3,000
C.	Disposal-10 drums	= 1,000
D.	Equipment-pumps,steam,etc	= 2,000
		Sub-Total = $8,000

Step 5 Rinsing Remaining Equipment

A.	Testing-10 Samples	= 2,000
B.	Labor	= 2,000
		Sub-Total = $4,000

Step 6 "Wipe" Sampling and Certification

A.	Take Samples-labor	= 200
B.	Testing- 14 samples	= 2,400
C.	Certification	= 600
		Sub-Total = $3,200

Sum of Closure Costs	$26,200
Contingency @ 20%	$ 5,240
Total Closure Cost	$31,440

Round Value to $32,000

As required by the RCRA regulations, presented in table 2 are the closure cost updates and the inflation factors used to bring the $32,000 closure cost to May 1985 dollars.

TABLE 2

CLOSURE COST UPDATES

YEAR	INFLATION FACTOR	UPDATED COST
MAY 1981	-	$32,000
May 1982	1.09	$34,880
May 1983	1.06	$36,973
May 1984	1.04	$38,452
May 1985	1.04	$39,990

9.0 SAMPLING PROCEDURES

Each drum of wastes, residue, or rinse water will be sampled and analyzed separately. Samples will be taken from the drums using a Coliwasa or glass "thief" sample tube. These sampling devices allow a composite sample to be taken covering all depths of the material. All glass sample tubes will be new, and will be discarded immediately after use. The Coliwasa ,if used, will be cleaned after each use with detergent, distilled water rinse, hexane rinse, and distilled water rinse in that order.

The wipe sampling method proposed is that issued by OSHA instruction CPL 2-2.20A, March 30, 1984, entitled Sampling for Surface Contamination. This procedure can be found in the 1984 Industrial Hygiene Technical Manual, and is included in appendix D.

Clean plastic disposable gloves will be worn at all times when performing the wipe sampling. As explained in the procedure, a Whatman filter will be moistened with distilled water, and be used to wipe approximately 100 cm^2 of the surface. All used filters from one incinerator section will be composited together as explained in appendix D, and taken to the laboratory for analysis.

Quality control of the samples will be maintained by:

1. Sampling with the appropriate instrument.
2. Use of the appropriate sample container and preservation techniques for the parameters of interest as described in EPA publication SW-846, Test Methods for Evaluation of Solid Waste, Physical/Chemical Methods, 1982, and as time to time amended.
3. Only persons instructed in using a particular sampling device shall take the sample.

10.0 TESTING AND DETERMINATION PROCEDURES

All wastes, residues, and rinse waters will be analyzed for the parameters in Table 3 using the extraction and test methods as found in EPA publication SW-846 and presented in this table. This list includes all the parameters which could be expected to be present in the cyanides and wax/solvents, the only hazardous wastes to have been burned, in addition to the hazardous waste characteristics of corrosivity, ignitability, reactivity, and Extraction Procedure toxicity.

TABLE 3

ANALYTICAL METHODS AND HAZARDOUS WASTE LEVELS

PARAMETER	EXTRACTION METHOD	ANALYTICAL METHOD	HAZARDOUS LEVELS
Arsenic	6010	7060 or 7061	5.0 (1.5)
Barium	6010	7080 or 7081	100.0 (30.0)
Cadmium	6010	7090 or 7091	1.0 (0.3)
Chromium- Total	6010	7190 or 7191	5.0 (1.5)
Chromium	6010	7195 or 7196 or	5.0 (1.5)
-Hexavalent		7197 or 7198	5.0 (1.5)
Lead	6010	7420 or 7421	5.0 (1.5)
Mercury	6010	7470 or 7471	0.2 (1.5)
Selenium	6010	7740 or 7741	1.0 (0.3)
Silver	6010	7760 or 7761	5.0 (1.5)
Cyanide	N/A	9010	10.0 (3.0)
pH (standard units)	N/A	9040	$\leq$2.0 or $\geq$12.5
Flash Point (^{o} C)	N/A	1010 or 1020	<60^{o} C
Solvents	Direct	8010	see text
1,1,1,Trichloro-	injection or		below
ethane	5020 or 5030		
Perchloroethylene			
Trichloroethylene			

All the above levels are in mg/l unless noted.
Delisting levels are in parentheses

The levels in this table, except cyanide, are taken directly from the Federal hazardous waste criteria as found in 40 CFR Section 261. Their is no cyanide level in the federal regulations, but the DEP's internal policy level of 10.0 mg/l of cyanide will be used. The hazardous criteria for solvents concentration will be that found in 40 CFR 261.3(a)(2)(iv) A or B, depending upon the solvent in question. Wastes and rinsate found to have concentrations above these levels will be considered hazardous wastes, and disposed of accordingly.

Quality control of the analysis will be maintained by:

1. Using the appropriate analytical methods as described in SW-846.
2. Using only State of Connecticut Certified Laboratories for the analysis. The State of Connecticut has its own strict quality control procedures which laboratories must meet before certification is given.

11.0 CERTIFICATION OF CLOSURE

The certification statement presented below will be submitted to the DEP upon completion of closure. The appropriate documentation supporting the engineer's portion of the certification will be furnished to the permitting authorities upon request until Pratt & Whitney has been released from the financial assurance requirements of 40 CFR 265.143 (h).

"I,_____, for Pratt & Whitney Group, United
(Name)
Technologies Corporation, owner and operator of the hazardous waste incinerator at 400 Main Street East Hartford, and I, _____, P.E., employed
(Name)
by_____, certify by means of our
(Firm)
signatures, that the incinerator named above has been closed in accordance with the method specified by the closure plan dated _____, and attached hereto. Closure was completed on _____.
(Date)

_____	_____
Pratt & Whitney Group	P.E.
_____	_____
Title	Firm
_____	_____
Date	Date

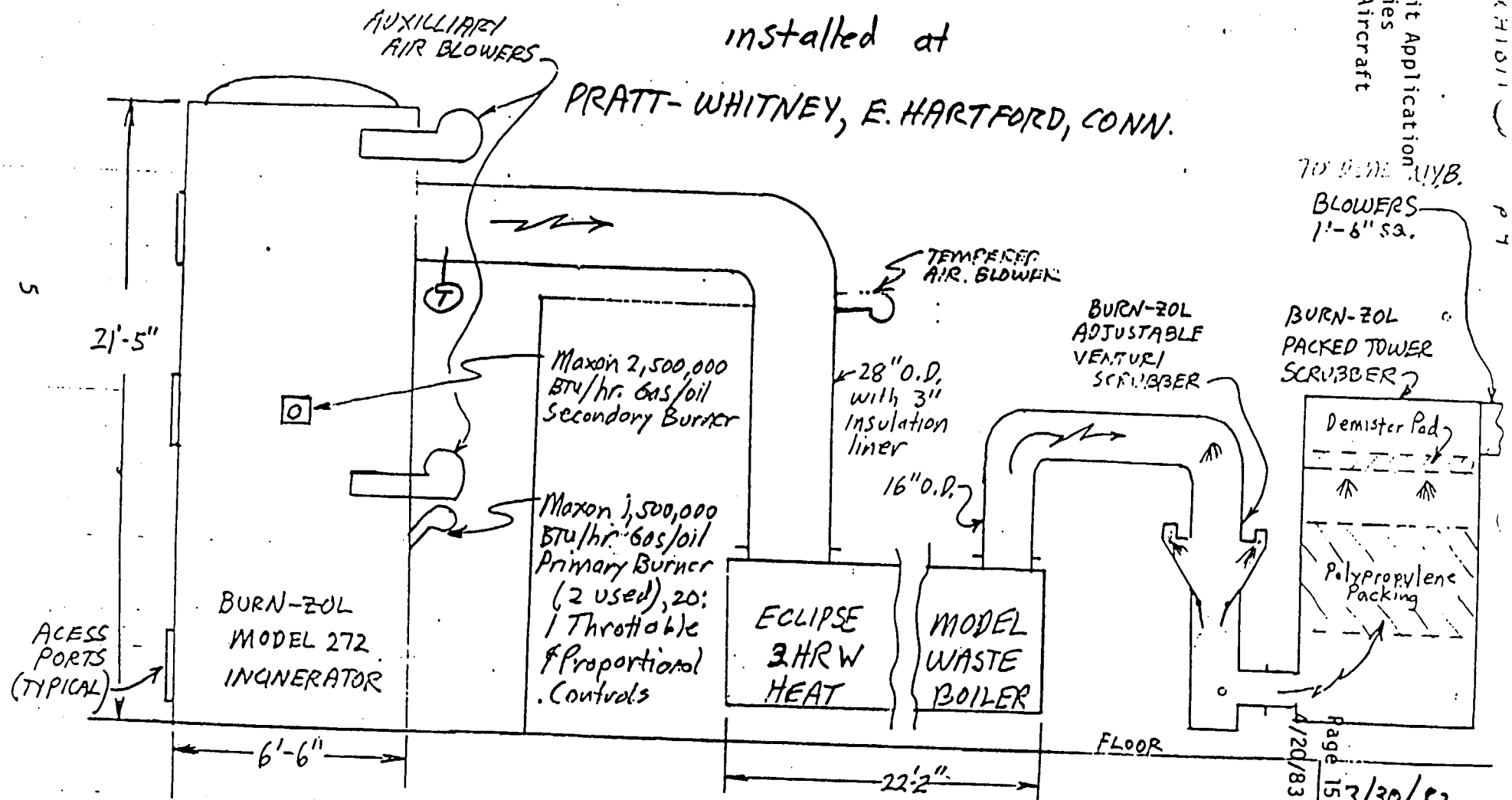
APPENDIX A

INCINERATOR DIAGRAM

HAZARDOUS WASTE INCINERATION SYSTEM

installed at

PRATT-WHITNEY, E. HARTFORD, CONN.



NOTE: A 1,200 ACFM COMBUSTION AIR BLOWER FEEDS THE 3 INCINERATOR BURNERS.

NOTE: SEE FOLLOWING PAGE FOR MORE INFO

(T) TEMP. SENSOR FOR RECORDER

APPENDIX B

HAZARDOUS WASTE ANALYTICAL DATA

Wax/solvents
Cyanide Solution

EXHIBIT BB p1

THE NEWLANDS SANITARY LABORATORY

A. RICHARD LOMBARDI, P.E.
PRESIDENT
THOMAS D. LEE
DIRECTOR
FREDERICK O. A. ALMQUIST, P.E.
SANITARY ENGINEER
H. F. SACHS
BACTERIOLOGIST
I. LAIRD NEWELL, P.E.
CONSULTANT

HENRY SOUTHER LABORATORIES, PROPRIETOR
SANITARY, CHEMICAL AND BACTERIOLOGICAL INVESTIGATIONS
24 TOBEY ROAD
BLOOMFIELD, CONNECTICUT 06002
TEL. (203) 242-6291

WATER SUPPLY AND PURIFICATION
SEWAGE & INDUSTRIAL WASTE DISPOSAL
DESIGN-SUPERVISION-VALUATION
CHEMICAL & BIOLOGICAL LABORATORIES
AIR POLLUTION STUDIES

RCRA Part B Permit Application
United Technologies
Pratt & Whitney Aircraft
CTD 990672081

October 12, 1981

Minges Associates, Inc.
16 Avon Park North
Avon, Connecticut 06001

Attention: Mr. Lawton Averill

Gentlemen:

We have the following to report on the samples submitted to this laboratory on September 11, 1981.

Sample No.	710852-A	710852-B
Mark:	Wax - Solvent Mixture Reported 9-11-81	
	Solvent Supernatant	Wax
Nickel (Ni)	57.7 ppm	51.0 ppm
Iron (Fe)	--	654. ppm
Aluminum (Al)	--	166. ppm

Very truly yours,

THE NEWLANDS SANITARY LABORATORY

Thomas D Lee

Thomas D. Lee
Laboratory Director

RECEIVED
THE MINGES ASSOC. INC.
OCT 19 1981

TDL:D

EXHIBIT BB p2

Sample No. 710852
Mark: RCRA Part B Permit Application
United Technologies Pratt & Whitney Aircraft
CTD 990672081 Sample of Wax-Solvent Mixture

Polychlorinated Biphenyls	less than	10	ppb
Pesticides:			
Endrin	less than	10	ppb
Lindane	less than	10	ppb
Methoxychlor	less than	10	ppb
Toxaphene	less than	10	ppb
Herbicides (Chlorophenoxys):			
2,4-D	less than	10	ppb
2,4,5-TP Silvex	less than	10	ppb
Purgeable Organics:			
1,1,2,2 Tetrachloroethylene		57.8	ppm
1,1,1 Trichloroethane		16.0	ppm
Aromatics (1R)		None Detected	
Water (Fisher Titration)		96%	

Note: The above tests were performed on the supernatant portion of the sample. The supernatant represents 25% of the total volume of the sample.

THE NEWLANDS SANITARY LABORATORY
BLOOMFIELD, CT. 06002

RCRA Part B Permit Application
United Technologies
Pratt & Whitney Aircraft
CTD 990672081

THE NEWLANDS SANITARY LABORATORY
HENRY SOUTHER LABORATORIES, PROPRIETOR
SANITARY, CHEMICAL AND BACTERIOLOGICAL INVESTIGATIONS
24 TOBEY ROAD
BLOOMFIELD, CONNECTICUT 06002
TEL. (203) 242-6291

FREDERICK O. A. ALMQUIST, P.E.
SANITARY ENGINEER
H. F. SACHS
BACTERIOLOGIST
E. LAIRD NEWELL, P.E.
CONSULTANT

WATER SUPPLY AND PURIFICATION
SEWAGE & INDUSTRIAL WASTE DISPOSAL
DESIGN-SUPERVISION-VALUATION
CHEMICAL & BIOLOGICAL LABORATORIES
AIR POLLUTION STUDIES

December 19, 1983

Minges Associates, Inc.
16 Avon Park North
Avon, Conn. 06001

Attn: Mr. Lawton Averill

Gentlemen:

We have the following to report on the sample submitted to this laboratory on October 7, 1983.

Sample No.	387J3
Mark	Solid/liquid sample 112-55-62
Infrared	
Solid	parrafin wax
Liquid	Water 85% Perchloroethylene 15%
Total Organic Carbon	
Solid	64.8%
Liquid	2.21%

Visual Examination
This material is approximately 20% liquid and 80% solid.

Very truly yours,

THE NEWLANDS SANITARY LABORATORY

Thomas D. Lee

Thomas D. Lee
Laboratory Director

/cas

THE MINGES ENVIRONMENTAL LABORATORY
A division of The Minges Associates, Inc.
11 Avon Park North, East Hartford, CT 06108
New: [illegible] Hamden, CT 06001
203-677-8309
Lawton S. Averill, Laboratory Director
Catherine M. Pintavalle, Chemist
Tara L. Vander Ela, Chemist

REPORT ON LABORATORY EXAMINATIONS

To Client: Pratt & Whitney Aircraft
Maintenance Bldg. - Mail Stop 122-12
East Hartford, CT 06108

Date: November 15, 1983

Att: W. Chudzik

SAMPLE DATA:

Collected By: Pratt & Whitney Aircraft

SAMPLE NO.	DESCRIPTION OF SAMPLE
112-55-64	Sample labeled "Cyanide" and received October 7, 1983

LABORATORY FINDINGS:

(milligrams per liter, mg/l, except as noted)

ANALYSIS FOR	SAMPLE NO. 112-55-64
Cyanide Total	21,300
Metals	
Aluminum	51
Cadmium	6020
Chromium, Total	4.3
Copper	940
Nickel	286
Zinc	11
Oil and Grease	48

Lawton S. Averill
The Minges Environmental Laboratory

THE NEWLANDS SANITARY LABORATORY
HENRY SOUTHER LABORATORIES, PROPRIETOR
SANITARY, CHEMICAL AND BACTERIOLOGICAL INVESTIGATIONS
24 TOBEY ROAD
BLOOMFIELD, CONNECTICUT 06002
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THOMAS D. LEE
DIRECTOR
FREDERICK O. A. ALMQUIST, P.E.
SANITARY ENGINEER
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WATER SUPPLY AND PURIFICATION
SEWAGE & INDUSTRIAL WASTE DISPOSAL
DESIGN-SUPERVISION-VALUATION
CHEMICAL & BIOLOGICAL LABORATORIES
AIR POLLUTION STUDIES

December 19, 1983

Minges Associates, Inc.
16 Avon Park North
Avon, Conn. 06001

Attn: Mr.Lawton Averill

Gentlemen:

We have the following to report on the sample submitted to this laboratory on December 8,1983.

Sample No.	351L3
Mark	Liquid sample 2% Cyanide 112-55-64

JRGEABLE ORGANICS:

Methylene Chloride	less than 100 ppb
1,1 Dichloroethylene	less than 100 ppb
1,1 Dichloroethane	less than 100 ppb
t-1,2 Dichloroethylene	less than 100 ppb
Chloroform	less than 100 ppb
1,2 Dichloroethane	less than 100 ppb
Bromodichloromethane	less than 100 ppb
1,1,1 Trichloroethane	less than 100 ppb
Carbon Tetrachloride	less than 100 ppb
1,1,2 Trichloroethylene	less than 100 ppb
Chlorodibromomethane	less than 100 ppb
Bromoform	less than 100 ppb
1,1,2,2 Tetrachloroethylene	less than 100 ppb

Very truly yours,
THE NEWLANDS SANITARY LABORATORY

Thomas D. Lee

Thomas D. Lee
Laboratory Director

TDL/cas

THE NEWLANDS SANITARY LABORATORY

HENRY SOUTHER LABORATORIES, PROPRIETOR
SANITARY, CHEMICAL AND BACTERIOLOGICAL INVESTIGATIONS
24 TOBEY ROAD
BLOOMFIELD, CONNECTICUT 06002
TEL. (203) 242-6291

WATER SUPPLY AND PURIFICATION
SEWAGE & INDUSTRIAL WASTE DISPOSAL
DESIGN-SUPERVISION-VALUATION
CHEMICAL & BIOLOGICAL LABORATORIES
AIR POLLUTION STUDIES

December 19, 1983

Minges Associates, Inc.
16 Avon Park North
Avon, Conn. 06001

Attn: Mr. Lawton Averill

Gentlemen:

We have the following to report on the sample submitted to this laboratory on December 8, 1983.

Sample No.	351L3
Mark	Liquid sample 2% Cyanide 112-55-64
,tal Organic Halides (TOX)	less than 10 ppb
Total Organic Carbon (TOC)	38.82 gms/Liter

Very truly yours,

THE NEWLANDS SANITARY LABORATORY

Thomas D. Lee

Thomas D. Lee
Laboratory Director

TDL/cas

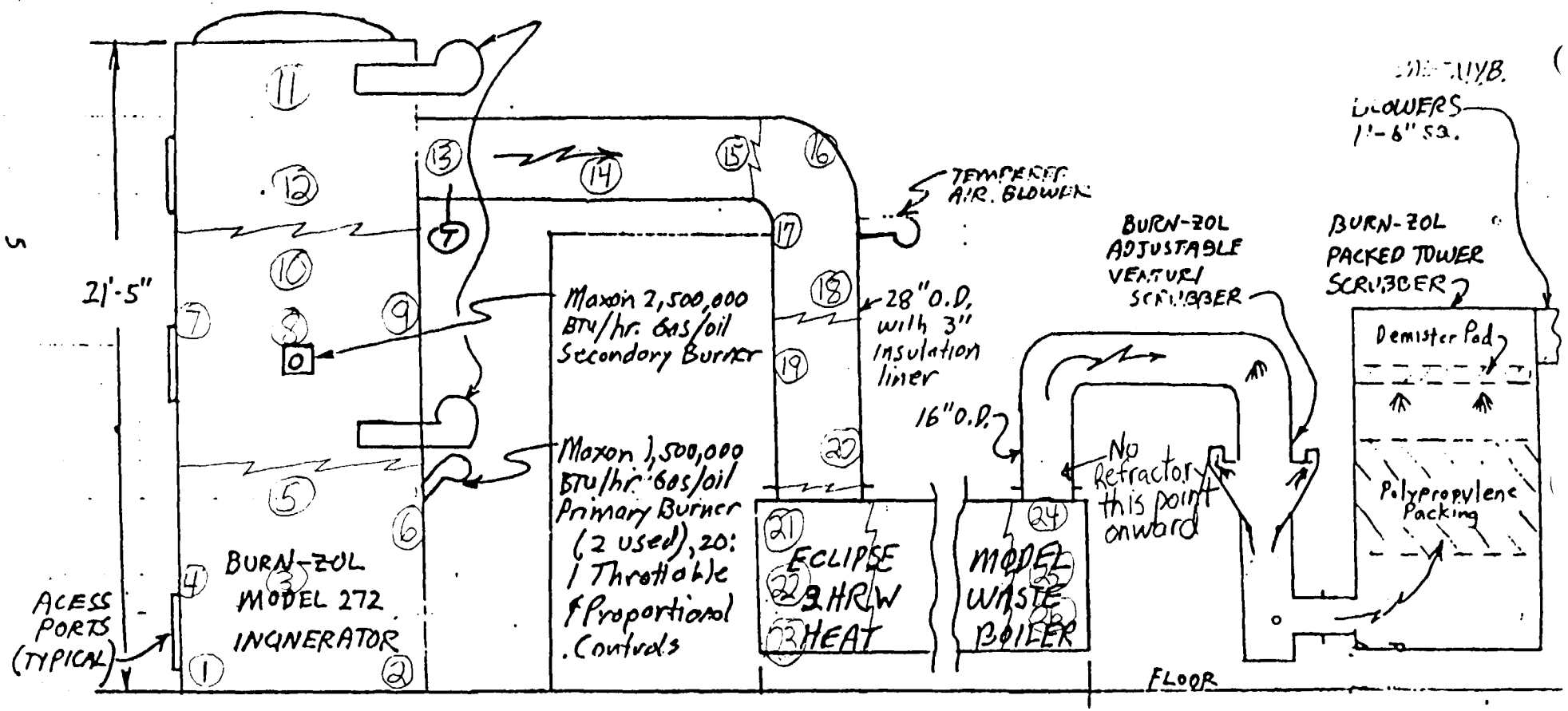
APPENDIX C

REFRACTORY SAMPLING INFORMATION

Location Diagram
Sample Description and Composite Information
Table of Composite Sample Results
Laboratory Data Sheet

N
N
E
S

REFRACTORY SAMPLE LOCATION DIAGRAM



REFRACTORY SAMPLE DESCRIPTION AND COMPOSITE INFORMATION

See accompanying diagram for further location information. Those samples which are in a continuous block under the location heading below were composited for analysis.

Sample #	Location
1	On hearth in front of access door.
2	On hearth under cyanide injection port.
3	Incinerator primary chamber- north wall.
4	Incinerator primary chamber- west wall above and around the cyanide injection port.
5	Incinerator primary chamber- around and above the solvents injection port.
6	Incinerator primary chamber- above the access port.
7	Secondary chamber above the access port.
8	Secondary chamber on north wall.
9	Secondary chamber on west wall.
10	Secondary chamber on south wall opposite secondary burner and ducted air flow.
11	Tertiary chamber on south wall and south half of dome.
12	Tertiary chamber on north wall and north half of dome.
13	Horizontal crossover pipe one foot from incinerator end.
14	Horizontal crossover pipe- center.
15	Horizontal crossover pipe one foot from the boiler end.
16	Pipe section on airflow impact surface of the elbow- west side.
17	Elbow section on east side two feet up from boiler end.
18	Elbow section- west side.
19	Boiler inlet pipe on east side two feet down from top of pipe section.
20	boiler inlet pipe on west side two feet up from boiler inlet.
21	South side of boiler inlet section.
22	North side of boiler inlet section.
23	Bottom of boiler inlet section.
24	South side of boiler exit section.
25	North side of boiler exit section.
26	Bottom of boiler exit section.

REFRACTORY COMPOSITE SAMPLE RESULTS

Composite of samples	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	Cn
1 and 2	<0.01	<0.2	0.015	46.4	0.06	<0.002	0.009	0.07	0.000
3,4,5,6	0.009	<0.2	0.11	1.1	0.00	<0.002	<0.01	0.01	0.000
7,8,9,10	<0.01	<0.2	0.008	0.23	0.00	<0.002	<0.01	0.003	0.000
11,12	<0.01	<0.2	0.007	0.56	0.00	<0.002	<0.01	0.000	0.000
13,14,15	<0.01	<0.2	0.13	0.50	0.00	<0.002	<0.01	0.003	0.000
16,17,18	<0.01	<0.2	0.08	0.51	0.00	<0.002	<0.01	0.024	0.000
19,20	<0.01	<0.2	0.032	0.44	0.03	<0.002	<0.01	0.023	0.000
21,22,23	<0.01	<0.2	0.59	0.17	0.17	<0.002	<0.01	0.12	0.000
24,25,26	<0.01	<0.2	0.15	0.01	0.02	<0.002	<0.01	0.018	0.000

AVERILL
ENVIRONMENTAL LABORATORY INC

P.O. Box 474, Riverdale Farms
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(203) 677-6283

Lawton S. Averill, Co-Director Paul C. Clark, Organic Supervisor Eric W. Snyder, Inorganic Supervisor Catherine M. Pintavalle, Co-Director

REPORT ON LABORATORY EXAMINATIONS

To Client: Pratt & Whitney
East Hartford, CT 06108

Date: June 27, 1986

SAMPLE DATA: Collected By: Pratt & Whitney

Samples from Incinerator at Concentrated Waste Treatment Plant, Pratt & Whitney, East Hartford

SAMPLE NO.	DESCRIPTION OF SAMPLE
289-23-955	Sample #1, East Hearth, Inc. 6-16-86.
289-23-956	Sample #2, West Hearth, Inc. 6-16-86.
289-23-955 Comp.	Composite of Sample Nos. 289-23-955 and 289-23-956 by weight.
289-23-955 Comp. E	100 grams of Sample No. 289-23-955 Comp. mixed with distilled water and 400 ml. of 0.5N acetic acid to a total volume of 2000 ml., mixed for 24 hrs. settled and filtered through 0.45 micron filter. Filtrate was tested.
289-23-955 Comp. DW	100 grams of Sample No. 289-23-955 Comp. mixed with distilled water to a total volume of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.

LABORATORY FINDINGS: (milligrams per liter, mg/l, except as noted)

ANALYSIS FOR	SAMPLE NO. 289-23-955 Comp.		SAMPLE NO. 289-23-955 Comp. E		SAMPLE NO. 289-23-955 Comp. DW
pH of 10% Slurry	10.7	Tests are mg/l in Filtrate		Tests are mg/l in Filtrate	
		Arsenic	less than 0.01	Chromium, Hexavalent	41.0
		Barium	less than 0.2	Cyanide, Total	0.000
		Cadmium	0.015	pH	10.0
		Chromium, Total	46.4		
		Lead	0.06		
		Mercury	less than 0.002		
		Selenium	0.009		
		Silver	0.07		
		pH	9.2		

cc: Pratt & Whitney
Att: Kevin Vidmar

Lawton S. Averill

The Averill Environmental Laboratory, Inc.

	EPA METHOD 601
	289-23-955C
Carbon tetrachloride	ND<20
Chlorobenzene	ND<20
1,2-Dichloroethane	ND<20
1,1,1-Trichloroethane	ND<20
1,1-Dichloroethane	ND<20
1,1,2-Trichloroethane	ND<20
1,1,2,2-Tetrachloroethane	ND<20
Chloroethane	ND<20
2-Chloroethyl vinyl ether	ND<20
Chloroform	ND<20
1,2-Dichlorobenzene	ND<20
1,3-Dichlorobenzene	ND<20
1,4-Dichlorobenzene	ND<20
1,1-Dichloroethylene	ND<20
trans-1,2-Dichloroethylene	ND<20
1,2-Dichloropropane	ND<20
trans-1,3-Dichloropropene	ND<20
cis-1,3-Dichloropropene	ND<20
Methylene chloride	ND<20
Chloromethane	ND<20
Bromomethane	ND<20
Bromoform	ND<20
Bromodichloromethane	ND<20
Trichlorofluoromethane	ND<20

Results are in ug/kg (ppb)

EPA METHOD 601

289-23-955C

Dichlorodifluoromethane	ND<20
Dibromochloromethane	ND<20
Tetrachloroethylene	ND<20
Trichloroethylene	ND<20
Vinyl chloride	ND<20

Results are in ug/kg (ppb)

Baron Consulting Co. 272 Pepe's Farm Rd. , Milford, Ct. 06460

AVERILL
ENVIRONMENTAL LABORATORY INC

P.O. Box 474, Riverdale Farms
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Lawton S. Averill, Co-Director Paul C. Clark, Organic Supervisor Eric W. Snyder, Inorganic Supervisor Catherine M. Pintavalle, Co-Director

REPORT ON LABORATORY EXAMINATIONS

To Client: Pratt & Whitney
East Hartford, CT 06108

Date: June 27, 1986

SAMPLE DATA: Collected By: Pratt & Whitney

Samples from Incinerator at Concentrated Waste Treatment Plant, Pratt & Whitney, East Hartford

SAMPLE NO.	DESCRIPTION OF SAMPLE
289-23-957	Sample #3, No. Side Pri. Inc., 6-16-86.
289-23-958	Sample #4, West Side Pri. Inc., 6-16-86.
289-23-959	Sample #5, So. Side, Pri. Inc., 6-16-86.
289-23-960	Sample #6, East Side Pri. Inc., 6-16-86.
289-23-957 Comp.	Composite of Sample Nos. 289-23-957, 289-23-958, 289-23-959 and 289-23-960 by weight.
289-23-957 Comp. E	100 grams of Sample No. 289-23-957 Comp. mixed with distilled water and 400 ml. of 0.5N acetic acid to a total volume of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.
289-23-957 Comp. DW	100 grams of Sample No. 289-23-957 Comp. mixed with distilled water to a total volume of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.

LABORATORY FINDINGS: (milligrams per liter, mg/l, except as noted)

ANALYSIS FOR	SAMPLE NO. 289-23-957 Comp.		289-23-957 Comp. E		289-23-957 Comp. DW
pH of 10% Slurry	10.9	Tests are mg/l in Filtrate		Tests are mg/l in Filtrate	
		Arsenic	0.009	Chromium, Hexavalent	1.1
		Barium	less than 0.2	Cyanide, Total	0.000
		Cadmium	0.11	pH	10.1
		Chromium, Total	1.1		
		Lead	0.00		
		Mercury	less than 0.002		
		Selenium	less than 0.01		
		Silver	0.010		
		pH	5.2		

cc: Pratt & Whitney
Att: Kevin Vidmar

Lawton S. Averill

The Averill Environmental Laboratory, Inc.

EPA METHOD 601

289-23-957C

Carbon tetrachloride	ND<20
Chlorobenzene	ND<20
1,2-Dichloroethane	ND<20
1,1,1-Trichloroethane	ND<20
1,1-Dichloroethane	ND<20
1,1,2-Trichloroethane	ND<20
1,1,2,2-Tetrachloroethane	ND<20
Chloroethane	ND<20
2-Chloroethyl vinyl ether	ND<20
Chloroform	ND<20
1,2-Dichlorobenzene	ND<20
1,3-Dichlorobenzene	ND<20
1,4-Dichlorobenzene	ND<20
1,1-Dichloroethylene	ND<20
trans-1,2-Dichloroethylene	ND<20
1,2-Dichloropropane	ND<20
trans-1,3-Dichloropropene	ND<20
cis-1,3-Dichloropropene	ND<20
Methylene chloride	ND<20
Chloromethane	ND<20
Bromomethane	ND<20
Bromoform	ND<20
Bromodichloromethane	ND<20
Trichlorofluoromethane	ND<20

Results are in ug/kg (ppb)

EPA METHOD 601

289-23-957C

Dichlorodifluoromethane	ND<20
Dibromochloromethane	ND<20
Tetrachloroethylene	ND<20
Trichloroethylene	ND<20
Vinyl chloride	ND<20

Results are in ug/kg (ppb)

Baron Consulting Co. 272 Pepe's Farm Rd. , Milford, Ct. 06460

AVERILL
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Lawton S. Averill, Co-Director Paul C. Clark, Organic Supervisor Eric W. Snyder, Inorganic Supervisor Catherine M. Pintavalle, Co-Director

REPORT ON LABORATORY EXAMINATIONS

To Client: Pratt & Whitney
East Hartford, CT 06108

Date: June 27, 1986

SAMPLE DATA: Collected By: Pratt & Whitney

Samples from Incinerator at Concentrated Waste Treatment Plant, Pratt & Whitney, East Hartford

SAMPLE NO.	DESCRIPTION OF SAMPLE
289-23-961	Sample #7, East side Sec. Inc., 6-16-86.
289-23-962	Sample #8, No. side Sec. Inc., 6-16-86.
289-23-963	Sample #9, West side Sec. Inc., 6-16-86.
289-23-964	Sample #10, So. side Sec. Inc., 6-16-86.
289-23-961 Comp.	Composite of Sample Nos. 289-23-961, 289-23-962, 289-23-963 and 289-23-964 by weight.
289-23-961 Comp. E	100 grams of Sample No. 289-23-961 Comp. mixed with distilled water and 16 ml. of 0.5N acetic acid to a total volume of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.
289-23-961 Comp. DW	100 grams of Sample No. 289-23-961 Comp. mixed with distilled water to a total volme of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.

LABORATORY FINDINGS: *(milligrams per liter, mg/l, except as noted)*

ANALYSIS FOR	SAMPLE NO. 289-23-961 Comp.		289-23-961 Comp. E		289-23-961 Comp. DW
pH of 10% Slurry	6.9	Tests are mg/l in Filtrate		Tests are mg/l in Filtrate	
		Arsenic	less than 0.01	Chromium, Hexavalent	0.51
		Barium	less than 0.2	Cyanide, Total	0.000
		Cadmium	0.008	pH	7.3
		Chromium, Total	0.23		
		Lead	0.00		
		Mercury	less than 0.002		
		Selenium	less than 0.01		
		Silver	0.003		
		pH	4.9		

cc: Pratt & Whitney
Att: Kevin Vidmar

Lawton S. Averill

The Averill Environmental Laboratory, Inc.

EPA METHOD 601

289-23-961C

Carbon tetrachloride	ND<20
Chlorobenzene	ND<20
1,2-Dichloroethane	ND<20
1,1,1-Trichloroethane	ND<20
1,1-Dichloroethane	ND<20
1,1,2-Trichloroethane	ND<20
1,1,2,2-Tetrachloroethane	ND<20
Chloroethane	ND<20
2-Chloroethyl vinyl ether	ND<20
Chloroform	ND<20
1,2-Dichlorobenzene	ND<20
1,3-Dichlorobenzene	ND<20
1,4-Dichlorobenzene	ND<20
1,1-Dichloroethylene	ND<20
trans-1,2-Dichloroethylene	ND<20
1,2-Dichloropropane	ND<20
trans-1,3-Dichloropropene	ND<20
cis-1,3-Dichloropropene	ND<20
Methylene chloride	ND<20
Chloromethane	ND<20
Bromomethane	ND<20
Bromoform	ND<20
Bromodichloromethane	ND<20
Trichlorofluoromethane	ND<20

Results are in ug/kg (ppb)

Baron Consulting Co.

EPA METHOD 601

289-23-961C

Dichlorodifluoromethane	ND<20
Dibromochloromethane	ND<20
Tetrachloroethylene	ND<20
Trichloroethylene	ND<20
Vinyl chloride	ND<20

Results are in ug/kg (ppb)

Baron Consulting Co. 272 Pepe's Farm Rd. , Milford, Ct. 06460

AVERILL
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Route 10N, Avon, CT 06001
(203) 677-6283

Lawton S. Averill, Co-Director Paul C. Clark, Organic Supervisor Eric W. Snyder, Inorganic Supervisor Catherine M. Pintavalle, Co-Director

REPORT ON LABORATORY EXAMINATIONS

To Client: Pratt & Whitney
East Hartford, CT 06108

Date: June 27, 1986

SAMPLE DATA: Collected By: Pratt & Whitney

Samples from Incinerator at Concentrated Waste Treatment Plant, Pratt & Whitney, East Hartford

SAMPLE NO.	DESCRIPTION OF SAMPLE
289-23-965	Sample #11, So. side Ter. Inc., 6-16-86.
289-23-966	Sample #12, No. side Ter. Inc., 6-16-86.
289-23-965 Comp.	Composite of Sample Nos. 289-23-965 and 289-23-966 by weight.
289-23-965 Comp. E	100 grams of Sample No. 289-23-965 Comp. mixed with distilled water and 7.2 ml. of 0.5N acetic acid to a total volume of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.
289-23-965 Comp. DW	100 grams of Sample No. 289-23-965 Comp. mixed with distilled water to a total volume of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.

LABORATORY FINDINGS: (milligrams per liter, mg/l, except as noted)

ANALYSIS FOR	SAMPLE NO. 289-23-965 Comp.		289-23-965 Comp. E		289-23-965 Comp. DW
pH of 10% Slurry	6.3	Tests are mg/l in Filtrate		Tests are mg/l in Filtrate	
		Arsenic	less than 0.01	Chromium, Hexavalent	0.68
		Barium	less than 0.2	Cyanide, Total	0.000
		Cadmium	0.007	pH	7.7
		Chromium, Total	0.56		
		Lead	0.00		
		Mercury	less than 0.002		
		Selenium	less than 0.01		
		Silver	0.000		
		pH	5.2		

cc: Pratt & Whitney
Att: Kevin Vidmar

Lawton S. Averill

The Averill Environmental Laboratory, Inc.

EPA METHOD 601

289-23-965C

Carbon tetrachloride	ND<20
Chlorobenzene	ND<20
1,2-Dichloroethane	ND<20
1,1,1-Trichloroethane	ND<20
1,1-Dichloroethane	ND<20
1,1,2-Trichloroethane	ND<20
1,1,2,2-Tetrachloroethane	ND<20
Chloroethane	ND<20
2-Chloroethyl vinyl ether	ND<20
Chloroform	ND<20
1,2-Dichlorobenzene	ND<20
1,3-Dichlorobenzene	ND<20
1,4-Dichlorobenzene	ND<20
1,1-Dichloroethylene	ND<20
trans-1,2-Dichloroethylene	ND<20
1,2-Dichloropropane	ND<20
trans-1,3-Dichloropropene	ND<20
cis-1,3-Dichloropropene	ND<20
Methylene chloride	ND<20
Chloromethane	ND<20
Bromomethane	ND<20
Bromoform	ND<20
Bromodichloromethane	ND<20
Trichlorofluoromethane	ND<20

Results are in ug/kg (ppb)

Baron Consulting Co.

EPA METHOD 601

289-23-965C

Dichlorodifluoromethane	ND<20
Dibromochloromethane	ND<20
Tetrachloroethylene	ND<20
Trichloroethylene	ND<20
Vinyl chloride	ND<20

Results are in ug/kg (ppb)

Baron Consulting Co. 272 Pepe's Farm Rd. , Milford, Ct. 06460

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Lawton S. Averill, Co-Director Paul C. Clark, Organic Supervisor Eric W. Snyder, Inorganic Supervisor Catherine M. Pintavalle, Co-Director

REPORT ON LABORATORY EXAMINATIONS

To Client: Pratt & Whitney
East Hartford, CT 06108

Date: June 27, 1986

SAMPLE DATA: Collected By: Pratt & Whitney

Samples from Incinerator at Concentrated Waste Treatment Plant, Pratt & Whitney, East Hartford

SAMPLE NO.	DESCRIPTION OF SAMPLE
289-23-967	Sample #13, Horiz. Sect. Inc. End, 6-16-86.
289-23-968	Sample #14, Horiz. Sect. Middle, 6-16-86.
289-23-969	Sample #15, Horiz. Sect. Boiler End, 6-16-86.
289-23-967 Comp.	Composite of Sample Nos. 289-23-967, 289-23-968 and 289-23-969 by weight.
289-23-967 Comp. E	100 grams of Sample No. 289-23-967 Comp. mixed with distilled waer and 11.2 ml. of 0.5N acetic acid to a total volume of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.
289-23-967 Comp. DW	100 grams of Sample No. 289-23-967 Comp. mixed with distilled water to a total volume of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.

LABORATORY FINDINGS: (milligrams per liter, mg/l, except as noted)

ANALYSIS FOR	SAMPLE NO. 289-23-967 Comp.		SAMPLE NO. 289-23-967 Comp. E		SAMPLE NO. 289-23-967 Comp. DW
pH of 10% Slurry	6.5	Tests are mg/l in Filtrate		Tests are mg/l in Filtrate	
		Arsenic	less than 0.01	Chromium, Hexavalent	0.48
		Barium	less than 0.2	Cyanide, Total	0.000
		Cadmium	0.13	pH	6.3
		Chromium, Total	0.50		
		Lead	0.00		
		Mercury	less than 0.002		
		Selenium	less than 0.01		
		Silver	0.003		
		pH	5.2		

cc: Pratt & Whitney
Att: Kevin Vidmar

Lawton S. Averill

The Averill Environmental Laboratory, Inc.

EPA METHOD 601

289-23-967C

Carbon tetrachloride	ND<20
Chlorobenzene	ND<20
1,2-Dichloroethane	ND<20
1,1,1-Trichloroethane	ND<20
1,1-Dichloroethane	ND<20
1,1,2-Trichloroethane	ND<20
1,1,2,2-Tetrachloroethane	ND<20
Chloroethane	ND<20
2-Chloroethyl vinyl ether	ND<20
Chloroform	ND<20
1,2-Dichlorobenzene	ND<20
1,3-Dichlorobenzene	ND<20
1,4-Dichlorobenzene	ND<20
1,1-Dichloroethylene	ND<20
trans-1,2-Dichloroethylene	ND<20
1,2-Dichloropropane	ND<20
trans-1,3-Dichloropropene	ND<20
cis-1,3-Dichloropropene	ND<20
Methylene chloride	ND<20
Chloromethane	ND<20
Bromomethane	ND<20
Bromoform	ND<20
Bromodichloromethane	ND<20
Trichlorofluoromethane	ND<20

Results are in ug/kg (ppb)

Baron Consulting Co.

EPA METHOD 601

289-23-967C

Dichlorodifluoromethane	ND<20
Dibromochloromethane	ND<20
Tetrachloroethylene	ND<20
Trichloroethylene	ND<20
Vinyl chloride	ND<20

Results are in ug/kg (ppb)

Baron Consulting Co. 272 Pepe's Farm Rd. , Milford, Ct. 06460

AVERILL
ENVIRONMENTAL LABORATORY INC

P.O. Box 474, Riverdale Farms
Route 10N, Avon, CT 06001
(203) 677-6283

Lawton S. Averill, Co-Director Paul C. Clark, Organic Supervisor Eric W. Snyder, Inorganic Supervisor Catherine M. Pintavalle, Co-Director

REPORT ON LABORATORY EXAMINATIONS

To Client: Pratt & Whitney
East Hartford, CT 06108

Date: June 27, 1986

SAMPLE DATA: Collected By: Pratt & Whitney

Samples from Incinerator at Concentrated Waste Treatment Plant, Pratt & Whitney, East Hartford

SAMPLE NO.	DESCRIPTION OF SAMPLE
289-23-970	Sample #16, West, Incl. Sec. Inlet Boiler, 6-16-86.
289-23-971	Sample #17, East, 2' up ELPC Inlet Boiler, 6-16-86.
289-23-972	Sample #18, West at cooler ELPC Inlet Boiler, 6-16-86.
289-23-970 Comp.	Composite of Sample Nos. 289-23-970, 289-23-971 and 289-23-972 by weight.
289-23-970 Comp. E	100 grams of Sample No. 289-23-970 Comp. mixed with distilled water and 18 ml.of 0.5N acetic acid to a total volume of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.
289-23-970 Comp.DW	100 grams of Sample No. 289-23-970 Comp. mixed with distilled water to a total volume of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.

LABORATORY FINDINGS: (milligrams per liter, mg/l, except as noted)

ANALYSIS FOR	SAMPLE NO. 289-23-970 Comp.		289-23-970 Comp. E		289-23-970 Comp. DW
pH of 10% Slurry	8.0	Tests are mg/l in Filtrate		Tests are mg/l in Filtrate	
		Arsenic	less than 0.01	Chromium, Hexavalent	1.58
		Barium	less than 0.2	Cyanide, Total	0.000
		Cadmium	0.08	pH	8.2
		Chromium, Total	0.51		
		Lead	0.00		
		Mercury	less than 0.002		
		Selenium	less than 0.01		
		Silver	0.024		
		pH	5.0		

cc: Pratt & Whitney
Att: Kevin Vidmar

Lawton S. Averill

The Averill Environmental Laboratory, Inc.

EPA METHOD 601

289-23-970C

Carbon tetrachloride	ND<20
Chlorobenzene	ND<20
1,2-Dichloroethane	ND<20
1,1,1-Trichloroethane	ND<20
1,1-Dichloroethane	ND<20
1,1,2-Trichloroethane	ND<20
1,1,2,2-Tetrachloroethane	ND<20
Chloroethane	ND<20
2-Chloroethyl vinyl ether	ND<20
Chloroform	ND<20
1,2-Dichlorobenzene	ND<20
1,3-Dichlorobenzene	ND<20
1,4-Dichlorobenzene	ND<20
1,1-Dichloroethylene	ND<20
trans-1,2-Dichloroethylene	ND<20
1,2-Dichloropropane	ND<20
trans-1,3-Dichloropropene	ND<20
cis-1,3-Dichloropropene	ND<20
Methylene chloride	ND<20
Chloromethane	ND<20
Bromomethane	ND<20
Bromoform	ND<20
Bromodichloromethane	ND<20
Trichlorofluoromethane	ND<20

Results are in ug/kg (ppb)

Baron Consulting Co.

EPA METHOD 601

289-23-970C

Dichlorodifluoromethane	ND<20
Dibromochloromethane	ND<20
Tetrachloroethylene	ND<20
Trichloroethylene	ND<20
Vinyl chloride	ND<20

Results are in ug/kg (ppb)

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To Client: Pratt & Whitney
East Hartford, CT 06108

Date: June 27, 1986

SAMPLE DATA: Collected By: Pratt & Whitney

Samples from Incinerator at Concentrated Waste Treatment Plant, Pratt & Whitney, East Hartford

SAMPLE NO.	DESCRIPTION OF SAMPLE
289-23-973	Sample #19, East 2' Down Duct into Boiler, 6-16-86.
289-23-974	Sample #20, West 2' Up Duct into Boiler, 6-16-86.
289-23-973 Comp.	Composite of Sample Nos. 289-23-973 and 289-23-974 by weight.
289-23-973 Comp.E	100 grams of Sample No. 289-23-973 Comp. mixed with distilled water and 14 ml. of 0.5N acetic acid to a total volume of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.
289-23-973 Comp.DW	100 grams of Sample No. 289-23-973 Comp. mixed with distilled water to a total volume of 2000 ml., mmixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.

LABORATORY FINDINGS: (milligrams per liter, mg/l, except as noted)

ANALYSIS FOR	SAMPLE NO. 289-23-973 Comp.		SAMPLE NO. 289-23-973 Comp. E		SAMPLE NO. 289-23-973 Comp. DW
pH of 10% Slurry	6.9	Tests are mg/l in Filtrate		Tests are mg/l in Filtrate	
		Arsenic	less than 0.01	Chromium, Hexavalent	0.56
		Barium	less than 0.2	Cyanide, Total	0.000
		Cadmium	0.032	pH	6.4
		Chromium, Total	0.44		
		Lead	0.03		
		Mercury	less than 0.002		
		Selenium	less than 0.01		
		Silver	0.023		
		pH	5.2		

cc: Pratt & Whitney
Att: Kevin Vidmar

Lawton S. Averill

The Averill Environmental Laboratory, Inc.

EPA METHOD 601

289-23-973C

Carbon tetrachloride	ND<20
Chlorobenzene	ND<20
1,2-Dichloroethane	ND<20
1,1,1-Trichloroethane	ND<20
1,1-Dichloroethane	ND<20
1,1,2-Trichloroethane	ND<20
1,1,2,2-Tetrachloroethane	ND<20
Chloroethane	ND<20
2-Chloroethyl vinyl ether	ND<20
Chloroform	ND<20
1,2-Dichlorobenzene	ND<20
1,3-Dichlorobenzene	ND<20
1,4-Dichlorobenzene	ND<20
1,1-Dichloroethylene	ND<20
trans-1,2-Dichloroethylene	ND<20
1,2-Dichloropropane	ND<20
trans-1,3-Dichloropropene	ND<20
cis-1,3-Dichloropropene	ND<20
Methylene chloride	ND<20
Chloromethane	ND<20
Bromomethane	ND<20
Bromoform	ND<20
Bromodichloromethane	ND<20
Trichlorofluoromethane	ND<20

Results are in ug/kg (ppb)

Baron Consulting Co.

EPA METHOD 601

289-23-973C

Dichlorodifluoromethane	ND<20
Dibromochloromethane	ND<20
Tetrachloroethylene	ND<20
Trichloroethylene	ND<20
Vinyl chloride	ND<20

Results are in ug/kg (ppb)

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REPORT ON LABORATORY EXAMINATIONS

To Client: Pratt & Whitney
East Hartford, CT 06108

Date: June 27, 1986

SAMPLE DATA: Collected By: Pratt & Whitney

Samples from Incinerator at Concentrated Waste Treatment Plant, Pratt & Whitney, East Hartford

SAMPLE NO.	DESCRIPTION OF SAMPLE
289-23-975	Sample #21, So. Side Boiler Inlet, 6-16-86.
289-23-976	Sample #22, No. Side Boiler Inlet, 6-16-86.
289-23-977	Sample #23, Bottom Boiler Inlet, 6-16-86.
289-23-975 Comp.	Composite of Sample Nos. 289-23-975, 289-23-976 and 289-23-977 by weight.
289-23-975 Comp. E	100 grams of Sample No. 289-23-975 Comp. mixed with distilled water and 0 ml. of 0.5N acetic acid to a total volume of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.
289-23-975 Comp. DW	100 grams of Sample No. 289-23-975 Comp. mixed with distilled water to a total volume of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.

LABORATORY FINDINGS: (milligrams per liter, mg./l, except as noted)

ANALYSIS FOR	SAMPLE NO. 289-23-975 Comp.		SAMPLE NO. 289-23-975 Comp. E		SAMPLE NO. 289-23-975 Comp. DW
pH of 10% Slurry	2.3	Tests are mg/l in Filtrate		Tests are mg/l in Filtrate	
		Arsenic	less than 0.01	Chromium, Hexavalent	0.00
		Barium	less than 0.2	Cyanide, Total	0.000
		Cadmium	0.59	pH	2.9
		Chromium, Total	0.17		
		Lead	0.17		
		Mercury	less than 0.002		
		Selenium	less than 0.01		
		Silver	0.12		
		pH	2.9		

cc: Pratt & Whitney
Att: Kevin Vidmar

Lawton S Averill

The Averill Environmental Laboratory, Inc.

EPA METHOD 601

289-23-975C

Carbon tetrachloride	ND<20
Chlorobenzene	ND<20
1,2-Dichloroethane	ND<20
1,1,1-Trichloroethane	ND<20
1,1-Dichloroethane	ND<20
1,1,2-Trichloroethane	ND<20
1,1,2,2-Tetrachloroethane	ND<20
Chloroethane	ND<20
2-Chloroethyl vinyl ether	ND<20
Chloroform	ND<20
1,2-Dichlorobenzene	ND<20
1,3-Dichlorobenzene	ND<20
1,4-Dichlorobenzene	ND<20
1,1-Dichloroethylene	ND<20
trans-1,2-Dichloroethylene	ND<20
1,2-Dichloropropane	ND<20
trans-1,3-Dichloropropene	ND<20
cis-1,3-Dichloropropene	ND<20
Methylene chloride	ND<20
Chloromethane	ND<20
Bromomethane	ND<20
Bromoform	ND<20
Bromodichloromethane	ND<20
Trichlorofluoromethane	ND<20

Results are in ug/kg (ppb)

Baron Consulting Co.

EPA METHOD 601

289-23-975C

Dichlorodifluoromethane	ND<20
Dibromochloromethane	ND<20
Tetrachloroethylene	ND<20
Trichloroethylene	ND<20
Vinyl chloride	ND<20

Results are in ug/kg (ppb)

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REPORT ON LABORATORY EXAMINATIONS

To Client: Pratt & Whitney
East Hartford, CT 06108

Date: June 27, 1986

SAMPLE DATA: Collected By: Pratt & Whitney

Samples from Incinerator at Concentrated Waste Treatment Plant, Pratt & Whitney, East Hartford

SAMPLE NO.	DESCRIPTION OF SAMPLE
289-23-978	Sample #24, So. Side Boiler Disch., 6-16-86.
289-23-979	Sample #25, No. Side Boiler Disch., 6-16-86.
289-23-980	Sample #26, Bottom Boiler Disch., 6-16-86.
289-23-978 Comp.	Composite of Sample Nos. 289-23-978, 289-23-979 and 289-23-980 by weight.
289-23-978 Comp.E	100 grams of Sample No. 289-23-978 Comp. mixed with distilled water and 61.6 ml. of 0.5N acetic acid to a total volume of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.
289-23-978 Comp.DW	100 grams of Sample No. 289-23-978 Comp. mixed with distilled water to a total volume of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.

LABORATORY FINDINGS: (milligrams per liter, mg/l, except as noted)

ANALYSIS FOR	SAMPLE NO. 289-23-978 Comp.		289-23-978 Comp.E		289-23-978 Comp.DW
pH of 10% Slurry	6.0	Tests are mg/l in Filtrate		Tests are mg/l in Filtrate	
		Arsenic	less than 0.01	Chromium, Hexavalent	0.00
		Barium	less than 0.2	Cyanide, Total	0.000
		Cadmium	0.15	pH	6.3
		Chromium, Total	0.01		
		Lead	0.02		
		Mercury	less than 0.002		
		Selenium	less than 0.01		
		Silver	0.018		
		pH	4.8		

cc: Pratt & Whitney
Att: Kevin Vidmar

Lawton S. Averill

The Averill Environmental Laboratory, Inc.

EPA METHOD 601

289-23-978C

Carbon tetrachloride	ND<20
Chlorobenzene	ND<20
1,2-Dichloroethane	ND<20
1,1,1-Trichloroethane	ND<20
1,1-Dichloroethane	ND<20
1,1,2-Trichloroethane	ND<20
1,1,2,2-Tetrachloroethane	ND<20
Chloroethane	ND<20
2-Chloroethyl vinyl ether	ND<20
Chloroform	ND<20
1,2-Dichlorobenzene	ND<20
1,3-Dichlorobenzene	ND<20
1,4-Dichlorobenzene	ND<20
1,1-Dichloroethylene	ND<20
trans-1,2-Dichloroethylene	ND<20
1,2-Dichloropropane	ND<20
trans-1,3-Dichloropropene	ND<20
cis-1,3-Dichloropropene	ND<20
Methylene chloride	ND<20
Chloromethane	ND<20
Bromomethane	ND<20
Bromoform	ND<20
Bromodichloromethane	ND<20
Trichlorofluoromethane	ND<20

Results are in ug/kg (ppb)

Baron Consulting Co.

EPA METHOD 601

289-23-978C

Dichlorodifluoromethane	ND<20
Dibromochloromethane	ND<20
Tetrachloroethylene	ND<20
Trichloroethylene	ND<20
Vinyl chloride	ND<20

Results are in ug/kg (ppb)

Baron Consulting Co. 272 Pepe's Farm Rd. , Milford, Ct. 06460

APPENDIX D

WIPE SAMPLING PROGRAM

OSHA procedure
Proposed Sample Location
Composite Information

INDUSTRIAL HYGIENE TECHNICAL MANUAL
CHAPTER VIII
SAMPLING FOR SURFACE CONTAMINATION

(Issued by OSHA Instruction CPL 2-2.20A, March 30, 1984)

A. Introduction.

1. *Purpose.* This chapter contains general instructions on the uses and techniques of wipe (swipe, smear) sampling.

2. *Definition.* The terms "wipe sampling," "swipe sampling" and "smear sampling" are used synonymously to describe the techniques used for assessing surface contamination. The term "wipe sampling" will be used in this chapter.

B. General Information.

1. *Surface Contamination.* There are a variety of reasons why surface contamination, and especially removable surface contamination, may need to be assessed. Several of these reasons are listed below:

a. Many toxic materials may gain entry into the body via ingestion and, in some instances, via penetration (absorption) through intact skin.

b. Surfaces which may contact food or other materials which are ingested or placed in the mouth (e.g., chewing tobacco, gum, cigarettes) may be wipe sampled (including hands and fingers) to show contamination.

c. Contact of contaminants with smoking materials may allow the toxic materials, or their combustion product, to enter the body via the lungs (e.g., lead, mercury vaporizes at low temperature). Wipe Sampling of surfaces which may contact smoking materials may be useful in evaluating this possible route of exposure (e.g., hands and fingers).

d. Skin irritants may be evaluated for potential contact by wiping surfaces, including exposed skin (fingers, hands).

e. Effectiveness of personal protectives gear (e.g., gloves, aprons, respirators, etc.) may sometimes be evaluated by wipe sampling the inner surfaces of the protective gear (and protected skin).

f. Effectiveness of decontamination of surfaces and protective gear (e.g., respirators) may sometimes be evaluated by wipe sampling.

g. Evaluation of contamination caused by work practices can sometimes be accomplished by wipe sampling, if accompanied by close observation of the operation being sampled.

h. Accumulated toxic materials may become resuspended in air, and may contribute to airborne exposures (e.g., asbestos, lead or beryllium). Bulk and wipe samples may aid in determining the possibility of this happening.

i. Wipe sampling of surfaces which may contact skin is often useful for substances which absorb through intact skin. However, *skin* wipes may not be useful for those substances which absorb rapidly through the skin. Biological monitoring for these substances or their metabolites, or biological markers, is often the only means of assessing their absorption. Skin wipes are *not* recommended for these substances. It is suggested that wipes of protective gear inside surfaces, or other surfaces which may contact skin, be used instead.

2. *False Negative Results.* There is a very strong possibility that wipe samples will give a false negative; that is, that surface contamination will not be removed by a wipe sample.

3. *Evaluation of Sampling Results.* The CSHO must use professional judgment on a case-by-case basis when evaluating the significance of positive wipe sampling results. Consider the presence of health effects, contribution of skin absorption (and/or gastrointestinal absorption) to the total dose, taking into consideration the ambient air concentrations, skin irritation, etc., when evaluating sample results.

4. *Hazardous Substances.* Appendix A, the Chemical Information Table, lists substances which represent a potential for ingestion toxicity, skin absorption, and/or have a hazardous skin effect. This information may be found in the "Wipe Sampling" section. Any additional toxicological information concerning chronic skin absorption, dermatitis, etc. should be utilized in determin-

ing if the resulting exposure presents a potential employee hazard.

C. General Technique of Wipe Sampling.

1. *Filter Media and Solvents.* Consult Appendix A, the Chemical Information Table, for appropriate filter media and solvents (dry wipes may be used; solvents are not always necessary but may enhance removal).

a. Direct skin wipes should *not* be taken when high skin absorption of a substance is expected. Under no conditions should any solvent other than distilled water be used on skin or personal protective gear which directly contacts the skin.

b. Generally, there are two types of filters recommended for taking wipe samples:

(1) Glass fiber filters (37mm) are usually used for materials which are analyzed by High Performance Liquid Chromatography (HPLC), and often for substances analyzed by Gas Chromatography (GC).

(2) Paper filters are generally used for metals, and may be used for anything *not* analyzed by HPLC. For convenient usage, the Whatman smear tab (or its equivalent) is strongly recommended.

c. Preloading a group of vials with appropriate filters is a convenient method. (The Whatman smear tabs should be inserted with the tab end out.) Always wear clean plastic gloves when handling filters (disposable gloves are recommended).

2. *Procedures.* Follow these procedures when wipe sampling is taken:

a. At the worksite, prepare a rough sketch of the area(s) or room(s) to be wipe sampled.

b. Put on a pair of clean impervious disposable gloves. A clean set of gloves should be used with each individual sample. This avoids contamination of the filter by the hand and the subsequent possibility for false positives, and prevents contact with the substance.

c. Withdraw the filter from the vial. If a damp wipe sample is desired, moisten the filter with distilled water (or other solvent as recommended in Appendix A, the Chemical Information Table).

CAUTION: Skin or personal protective equipment must only be wiped DRY, or with distilled water, never with solvents. Remember also, skin wipes should *not* be done for materials with high skin absorption. It is recommended that *hands* and fingers be the only skin surfaces wiped. Permission of the employee should of course be sought. Before any skin wipe is taken, explain why you want the sample. If the employee refuses, do not force the issue.

d. Wipe approximately 100 cm^2 of the surface to be sampled.

e. Without allowing the filter to contact any other surface, fold the filter with the exposed side in, then fold it over again. Place the filter in a sample vial, cap the vial, number it, and place a corresponding number at the sample location on the sketch. Include notes with the sketch giving any further description of the sample (e.g., "Fred Employee's respirator, inside;" "Lunch table;" etc.).

f. At least one blank filter treated in the same fashion, but without wiping, should be submitted for each sampled area.

g. Submit the samples to SLCAL with the appropriate OSHA 91.

D. Special Techniques for Wipe Sampling.

1. *Acids and Bases.* When examining surfaces for contamination with strong acids or bases, moistened pH paper may be used.

2. *Direct Reading Instruments.* For some types of surface contamination (e.g., mercury sniffer for mercury), direct reading instruments may sometimes be used.

3. *Field Analytical Evaluation for Carcinogenic Aromatic Amines:*

a. As in the case of routine wipe sampling, wear clean, disposal impervious gloves. Wipe an area of approximately 100 cm^2 with a Whatman 42, 7 cm (2.8-inch) diameter filter paper moistened with 5 drops of methanol (placed in the center).

b. After wiping the sampling area, apply 3 drops of fluoroescamine (a visualization reagent supplied by SLCAL upon request) to the contaminated area of the filter.

c. Place a drop of the reagent on an area of the filter which has not contacted the surface. This provides a blank adjacent to the test area.

d. After a reaction time of 6 minutes, irradiate the filter witth a 366 nm U.V. light.

e. Compare the color development of the contacted area with the noncontacted area and refer to Figure VIII-I.

f. If discoloration is observed on the filter, collect another sample using the same procedure, and send it to the SLCAL for confirmation of results.

Figure VIII-1

Color of the Fluorescent Derivative after Irradiation with 366 nm Ultraviolet Light

Cancer-Suspected Agent	Fluorogenic Reagent (Fluoroescamine)
4,4'-Methylene bis (2-chloroaniline)	Yellow
Benzidine	Yellow
3,3'-Dichlorobenzidine	Yellow
alpha-Napthylamine	Yellow
beta-Naphthylamine	Yellow
4-Aminobiphenyl	Yellow

NOTE: Biological evaluation of these compounds or their metabolites in urine is frequently done and is often the most revealing test of absorbed dose.

E. Notes to Appendix A, Chemical Information Table.

1. *Do not wipe the skin* or substances which absorb through skin.

2. In some instances, skin absorption of a substance may take place, but surface wipes are not recommended due to the nature of the material in question. Most organic solvents are not suitable for wipes, but surface contaminatin can be judged by other means, if necessary (e.g., by use of detector tubes, the Organic Vapor Analyzer, HNU-Photo Ionization Analyzer, or other similar instruments).

3. Some substances are not stable enough as samples to be wipe sampled reliably.

4. Some substances should have solvent added to the vital as soon as the wipe sample is placed in the vial (e.g., Benzidine). These substances will be indicated with an "X" next to the solvent notation.

5. In some instances, it may be feasible to take a surface wipe sample, but it is generally not recommended because:

a. There is not a significant potential for skin absorption.

b. The substance is not very toxic by absorption or ingestion, or is not an irritant.

6. The typical rule of thumb for taking surface wipe samples is:

a. Skin Absorption - Wipe (if feasible) if OSHA or ACGIH shows a "skin" notation, or substance has a skin LD50 of 200 mg/kg or less.

b. Skin Irritant - Wipe (if feasible) if the substance is an irritant, causes dermatitis, contact sensitization, or is termed corrosive. It is sometimes possible to substitute moist pH paper instead of sampling for corrosives.

c. Ingestion - *Do not* wipe (even if feasible) if the substance has an acute oral LD50 of greater than 500 mg/kg and has no significant chronic toxicity when orally administered.

Chemical Name	CAS No.	IMIS No.

Chromic Acid & Chromates (as Cr03) Continued

Sodium Chromate 7778-11-3
STDS: TLV: 0.05 mg/m³ TWA
MLTH: NTP Listed in 2nd Annual Report on Carcinogens '81.

Sodium Dichromate 10588-01-9
STDS: TLV: 0.05 mg/m³ TWA
MLTH: NTP Listed in 2nd Annual Report on Carcinogens '81.

Chromium, Soluble Chromic, Chromous Salts 7440-47-3S 0690
STDS: OSHA: 0.5 mg/m3
TLV: 0.05 mg/m³ TWA
DESC: Solid
MLTH: Cumulative lung damage (10).
Dermatitis (3).
SLC1: MEDIA: MCEF 0.8u
MAX V: 960 liters MAX F: 2.0 lpm
AML 1: Atomic absorption spectroscopy
REF: 2 SAE: .15 CLASS: Part. Validation
NOTE: Submit as a separate sample. If the filter is not overloaded, samples may be collected up to an 8-hour period. For more information, please call Ray Abel, FTS-588-4270.
WIPE: Yes FILTER: Whatman Smeartab
SOLVENT: Dry or Dist. water
SKIN IRR: Yes
INGES ACUTE: Salts are corrosive; Acute toxicity varies: Chromium Chloride Rat LD50: 1870 mg/kg
BIOL METHOD: Soluble chrome salts, urinary chrome by atomic absorption.

Chromium, Metal & Insoluble Salts 7440-47-3 0685
STDS: OSHA: 1 mg/m³
TLV: 0.5 mg/m³ TWA, For metal and CrII, CrIII salts, as Cr.
SLC1: MEDIA: MCEF 0.8u
MAX V: 960 liters MAX F: 2.0 lpm
AML 1: Atomic absorption spectroscopy
REF: 2 SAE: .15 CLASS: Full Validation
AML 2: Inductively coupled plasma
REF: SAE: 0.11 CLASS: Full Validation
NOTE: If the filter is not overloaded, samples may be collected up to an 8-hour period. When analysis of a compound is requested, an elemental analysis is performed and reported as the compound. For more information, please call Ray Abel, FTS-588-4270.
WIPE: Yes FILTER: Whatman Smeartab
SOLVENT: Dist. water
SKIN IRR: Yes

Chromium, Unidentified Chromium Substance C111

Chrysene 218-01-9 0692
MLTH: IARC CARC: Animal Positive. '73.
ACGIH: A2 (Suspect carcinogen).
WIPE: Yes FILTER: GFF
SKIN ABS: Skin carcinogen: Mouse 3.6 mg/kg

Clopidol (Coydem) 2971-90-6 0693
STDS: TLV: 10 mg/m³ TWA; 20 mg/m³ STEL
DESC: Solid
MLTH: Good Housekeeping Practices (18).

Coal Dust 68131-74-8 9040
STDS: OSHA: 1910.1000 Z-3
TLV: 2 mg/m³ TWA (respirable dust fraction, less than 5 % Quartz. If greater than 5 % Quartz, use respirable mass formula).
DESC: Solid
MLTH: Pneumoconiosis (10).
SLC1: MEDIA: Tared, LAPVC 5 u preceded by 10mm cyclone
MAX V: 800 liters MAX F: 1.7 lpm
AML 1: Gravimetric
REF: 1 SAE: .10 CLASS: Full Validation
NOTE: If the gross weight sample yields a concentration below the standard for the air contaminant, do not submit the sample to the laboratory for analysis. If a gravimetric analysis is not sufficient, submit the filter to the laboratory for XRD analysis for quartz. For more information, please call Steve Edwards, FTS-588-4270.
WIPE: No

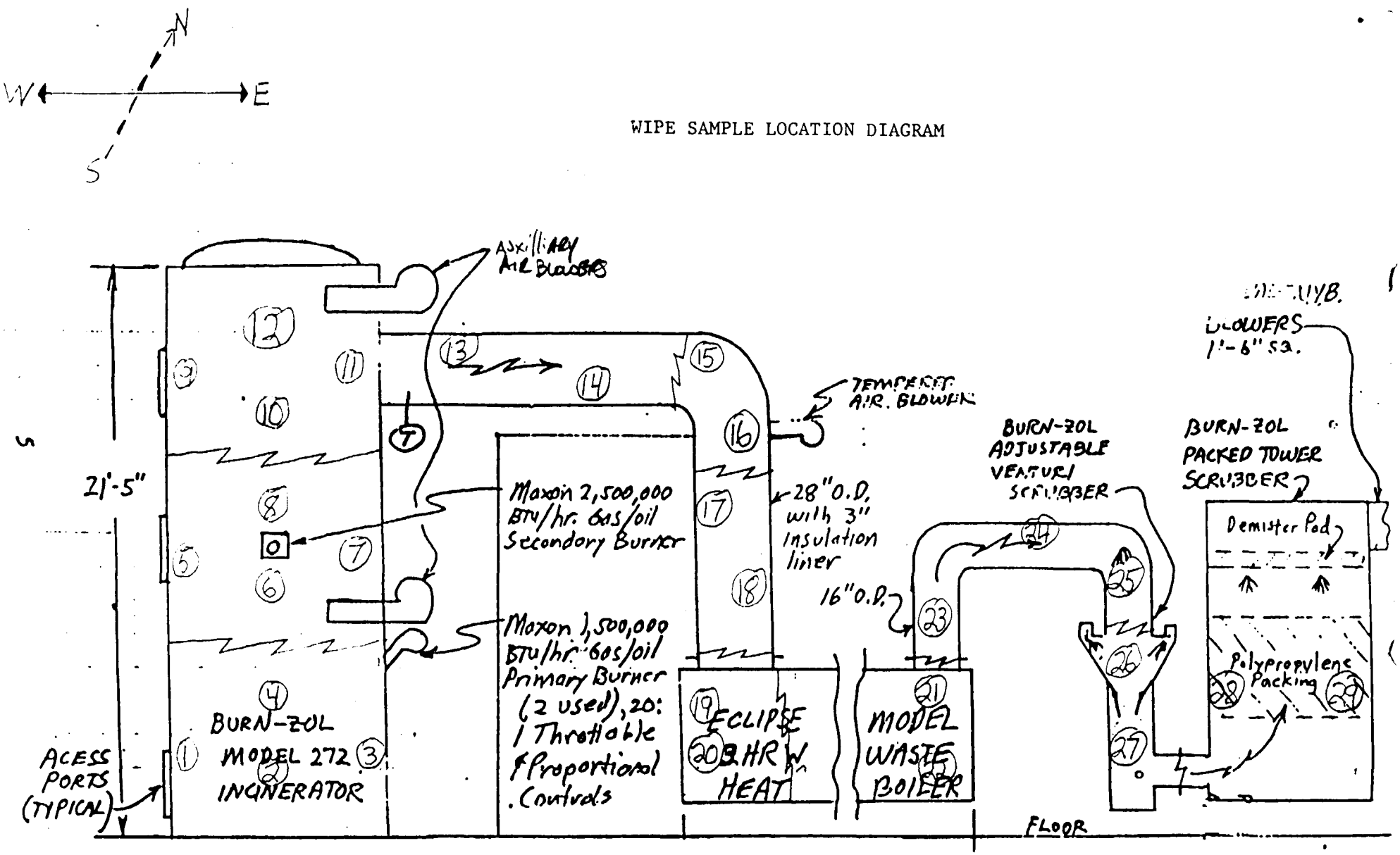
Coal Tar Pitch Volatiles (as Benzene Soluble Fraction) 8007-45-2 0700
STDS: OSHA: 0.2 mg/m³
TLV: 0.2 mg/m³ TWA
DESC: MIX
MLTH: Suspect Carcinogen (2).
Cumulative lung damage (10).
ACGIH: A1a (Suspect carcinogen).
NTP Listed in 2nd Annual Report on Carcinogens, '81.
SLC1: MEDIA: GFF
MAX V: 960 liters MAX F: 2.0 lpm
AML 1: Extraction-gravimetric
REF: 1, 2 SAE: .25 CLASS: Full Validation
NOTE: Submit as a separate sample.
WIPE: Yes FILTER: GFF SOLVENT: Dry
SKIN ABS: Sensitizes skin to light
SKIN IRR: Also skin cancer, mice, prolonged exposure.

Cobalt, Metal, Fume & Dust (as Co) 7440-48-4 0720
STDS: OSHA: 0.1 mg/m³
TLV: 0.1 mg/m³ TWA
DESC: Solid
MLTH: Asthma (9).
Cumulative lung changes (10).
Dermatitis (3).
SLC1: MEDIA: MCEF 0.8u
MAX V: 960 liters MAX F: 2.0 lpm
AML 1: Atomic absorption spectroscopy
REF: 2 SAE: .11 CLASS: Full Validation
AML 2: Inductively coupled plasma
REF: 2 SAE: 0.11 CLASS: Partial Validation
NOTE: If the filter is not overloaded, samples may be collected up to an 8-hour period. For more information, please call Ray Abel, FTS-588-4270.
WIPE: Yes FILTER: Whatman smeartab
SOLVENT: Dist. Water
SKIN IRR: Dermatitis
INGES ACUTE: Rat LD50: 1500 mg/kg
BIOL METHOD: Urinary cobalt, colorimetric, but no correlation at present.

Coke Oven Emissions 0725
STDS: OSHA: 0.15 mg/m³
MLTH: Cancer---Lungs, Bladder, Kidney (1).
Skin sensitization (3).
NTP Listed in 2nd Annual Report on Carcinogens, '81.
SLC1: MEDIA: GFF
MAX V: 960 liters MAX F: 2.0 lpm
AML 1: Extraction-gravimetric
REF: 1, 2 SAE: .17 CLASS: Full Validation
NOTE: Submit as a separate sample. If the filter is not overloaded, samples may be collected up to an 8-hour period.
WIPE: Yes FILTER: GFF SOLVENT: Dry
SKIN ABS and IRR: See coal tar pitch volatiles.

Copper Dusts & Mists (as Cu) 7440-50-8 0730
STDS: OSHA: 1 mg/m³
TLV: 1 mg/m³ TWA; 2 mg/m³ STEL
DESC: OS
MLTH: Irritation-Eyes, Nose, Throat, Skin---Mild (16, Less than 2 mg/m³).
SLC1: MEDIA: MCEF 0.8u
MAX V: 960 liters MAX F: 2.0 lpm
AML 1: Atomic absorption spectroscopy
REF: 2 SAE: .12 CLASS: Full Validation
AML 2: Inductively coupled plasma
REF: 2 SAE: 0.12 CLASS: Full Validation
NOTE: If the filter is not overloaded, samples may be collected up to an 8-hour period. Analytical method does not distinguish between dust and fume. If there are any questions, please call Ray Abel, FTS-588-4270.
WIPE: Yes FILTER: Whatman Smeartab
SOLVENT: Dry of Dist. Water
SKIN IRR: Yes, and Sensitization
INGES ACUTE: Varies with compound:
Copper Dust, Human TDLo: 120 ug/kg
Copper Sulfate, Human LDLo: 50 mg/kg
BIOL METHOD: Urinary copper by atomic absorption spectroscopy

WIPE SAMPLE LOCATION DIAGRAM



SAMPLES 30,31 - Second Demister
32,33 - Air Blower impellers
34,35 - Exhaust Stack

WIPE SAMPLE DESCRIPTION AND COMPOSITE INFORMATION

The following wipe samples will be taken on the inside of the incinerator train equipment. See accompanying diagram for further location information. Those samples which are in a continuous block under the location heading below will be composited for analysis.

Sample #	Location
1,2,3,4	Middle of incinerator primary chamber, west, south, east, and north walls respectively.
5,6,7,8	Middle of incinerator secondary chamber, west, south, east, and north walls respectively.
9,10,11,12	Middle of incinerator tertiary chamber (if possible to reach), west, south, east, and north walls respectively.
13,14	Horizontal crossover pipe, west and east ends respectively.
15,16	Elbow pipe section, each end.
17,18	Boiler inlet pipe, each end.
19,20	Top and bottom of boiler inlet section.
21,22	top and bottom of boiler outlet section.
23,24,25	Piping from boiler to venturi scrubber, beginning, middle, and end respectively.
26,27	Venturi scrubber section, top and bottom.
28,29	Packed tower scrubber, from where polypropylene packing was. West and east walls.
30,31	Walls of second demister, west and east.
32,33	Air blower impellers, two different locations.
34,35	Exhaust stack, middle of east and west walls.